AMENDMENT

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently amended) A method of etching a Si ~~targat~~ target object, which is a Si substrate or a Si layer formed on a substrate, by using a plasma, said method comprising the steps of:

placing the Si ~~targat~~ target object, coated with a mask, in a processing vessel;

supplying a mixed etching gas into the processing vessel, the etching gas containing fluorosulfur or fluorocarbon gas, O_2 gas and fluorosilicon gas; and

applying a first RF voltage having a first frequency of 40 MHz or above to a first electrode to couple RF power from the first electrode to a second electrode in the processing vessel, thereby generating a plasma from the etching gases, wherein

said method etches parts of the Si substrate or the Si layer to form holes with diameters of about 3 μm or below and depths of about 15 μm or below, or to form grooves with widths of about 3 μm or below and depths of about 15 μm or below; and

the mixed etching gas is supplied into the processing vessel with flow rate ratios between those of fluorosulfur or fluorocarbon gas, O_2 gas and fluorosilicon gas being in the range of 1/(0.6 to 0.67)/(0.33 to 2.33).

2. (Original) The method according to claim 1, wherein the etching gas has a fluorosilicon concentration of 10% or above.

3. (Original) The method according to claim 1, wherein a ratio of an O_2 gas concentration to a fluorosulfur or fluorocarbon gas concentration in the etching gas is in the range of 0.2 to 0.8.

4. (Original) The method according to claim 1, wherein a magnetic field is created between the electrodes at least when applying the first RF voltage, and wherein a direction of the magnetic field is perpendicular to a direction of an electric field created between the electrodes by applying the first RF voltage.

5. (Original) The method according to claim 4, wherein the magnetic field has a magnetic flux density of 170 G or above.

6. (Original) The method according to claim 1, wherein the processing vessel is provided therein with a susceptor adapted to support the object thereon, and a first RF power source is electrically connected to the susceptor to apply the first RF voltage to the susceptor serving as the first electrode.

7. (Currently Amended) The method according to claim 6, wherein a second RF power source is electrically connected to the susceptor, and the second RF power source applies a second RF voltage having a second frequency lower than the first frequency to the susceptor when the first RF power source applies the first RF voltage to the susceptor.

8. (Original) The method according to claim 7, wherein the second frequency is 3.2 MHz.

9. (Original) The method according to claim 1, wherein a pressure in the processing vessel is in the range of 50 millitorr to 10 torr.

10. (Currently Amended) The method according to claim 1, wherein the processing vessel is provided therein with a susceptor adapted to support the object thereon and ~~serving~~ serve as the first electrode, and wherein the temperature of an object supporting surface of the susceptor is in the range of
-30°C to 20°C.

11. (Canceled)

12. (Currently amended) The method according to ~~claim 11~~ claim 1, wherein the first RF power has a power flux density in the range of 1.5 to 6.4 W/cm^2.

13. (Currently amended) The method according to ~~claim 11~~ claim 1, wherein a pressure in the processing vessel is in the range of 50 millitorr to 250 millitorr.

14. (Canceled)

15. (Currently Amended) The method according to ~~claim 14~~ claim 1, wherein the mask comprises a SiO_2 film, and the RF power has a power flux density in the range of 6.8 to 12.5 W/cm^2.

16. (Currently Amended) The method according to ~~claim 14~~ claim 1, wherein the mask comprises a resist film, and the RF power has a power flux density in the range of 2.55 to 5.67 W/cm^2.

17. (Currently Amended) The method according to ~~claim 14~~ claim 1, wherein a pressure in the processing vessel is in the range of 150 millitorr to 450 millitorr.

18. (Original) The method according to claim 1, wherein the fluorosulfur gas is supplied into the processing vessel, and the fluorosulfur gas is SF_6 gas.

19. (Original) The method according to claim 1, wherein the fluorosilicon gas is supplied into the processing vessel, and the fluorosilicon gas is SiF_4 gas.